

## A clinical study of prevalence, spectrum of respiratory distress and immediate outcome in neonates

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### Abstract

**Background:** Respiratory distress in neonates is one of the important clinical manifestations of a variety of disorders of the cardiopulmonary or non-cardiopulmonary origin. It is also one of the most common causes of admission in NICU within 48-72 hours. This study aims to know the prevalence and spectrum of respiratory distress in neonates. To estimate the outcome of respiratory distress in neonates admitted in NICU.

**Material & Methods:** This retrospective study conducted at pediatric hospital NICU, Bikaner from May 2016 to July 2016. Data from case files of neonates with respiratory distress admitted to NICU over three months period were extracted and total number of neonates admitted in NICU data extracted from hospital register book.

**Results:** Prevalence of respiratory distress in admitted neonates was 29.6%. Most common cause for respiratory distress was sepsis (pneumonia) 38.9% followed by respiratory distress syndrome (23%), meconium aspiration syndrome (20.5%), transient tachypnea of newborn (10%), congenital heart disease (6%), congenital diaphragmatic hernia (1%) and pulmonary hemorrhage (1%). In our study prevalence of mortality in respiratory distress neonate was 41% (82), of these most common cause of mortality was sepsis followed by respiratory distress syndrome.

**Conclusions:** Respiratory distress in neonates is the most commonly encountered problem in NICU. Early diagnosis and treatment will prevent the mortality. Our study strongly recommends following simple steps like hand washing, breastfeeding and antenatal steroid therapy which will prevent respiratory distress in neonates. Early recognition and treatment of the common neonatal respiratory diseases will decrease both short- and long-term complications and related mortality of at-risk infants.

**Keywords:** Neonates; NICU; Respiratory Distress; Sepsis; Respiratory Distress Syndrome.

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### Introduction

Respiratory distress in neonates is one of the important clinical manifestations of a variety of disorders of the cardiopulmonary or non-cardiopulmonary origin. It is also one of the most common causes of admission in NICU within 48-72 hours [1]. Respiratory distress is one of the most common reasons an infant is admitted to the neonatal intensive care unit. It occurs in approximately 0.96%-6% of live births, and is responsible for about 20% of neonatal mortality [2]. The spectrum of respiratory distress in neonates include transient tachypnea of newborn, respiratory distress syndrome, Meconium aspiration syndrome, congenital pneumonia, congenital heart disease, Perinatal asphyxia, sepsis, Pneumothorax, persistent pulmonary hypertension, and congenital anomalies as tracheo-oesophageal fistula, and congenital diaphragmatic hernia, hematological-polycythemia (and other miscellaneous causes) and metabolic(hypothermia, hypoglycemia) [3,4]. The clinical presentation of respiratory distress in newborn includes apnea, cyanosis, grunting, inspiratory stridor, nasal flaring, poor feeding, and tachypnea. Initial evaluation for persistent or severe respiratory distress may include complete blood count with differential, chest radiography, and pulse oximetry. Treatment options are resuscitation, oxygenation, surfactant replacement and ventilation. Failure to readily recognize symptoms and treat the underlying cause of respiratory distress in the newborn can lead to short and

long-term complications including chronic lung disease, respiratory failure, and even death [5].

There have been very few studies on neonates with respiratory distress. In developing countries there is paucity of studies on causes of respiratory distress in newborn. Our pediatric hospital is the main referral center for neonates in Northwest part of Rajasthan. So far in western part of Rajasthan no studies were done on respiratory distress. Hence, this study was taken up to know the exact number of prevalence and spectrum of respiratory distress, morbidity and outcome in neonates.

### Materials and Methods

This retrospective study conducted at pediatric hospital NICU, Bikaner from May 2016 to July 2016. Institute ethical committee approved our study. The study criteria include 'out born neonates with respiratory distress from birth till 28th day of life' and exclude newborns born beyond 28th day of life. All perinatal details were studied. Data from case files of neonates with respiratory distress admitted to NICU over a 3 month period were extracted. All Data collected included: Obstetric history: maternal diseases (diabetes mellitus-hypertension), premature rupture of membranes and mode of delivery. Clinical examination data on admission included: Weight, sex, gestational age, vital signs, and degree of respiratory distress, in addition to any positive clinical findings reported. Radiological: chest X-ray (routine), X-ray abdomen, abdominal

Ultrasonography, ECHO, cranial Ultrasonography (if available). Laboratory evaluation included; complete blood count with differential, reticulocyte count, blood culture and sensitivity, electrolytes, blood sugar, blood gases. All collected data was tabulated and statistically analyzed by using SPSS software version 16 (SPSS Inc., Chicago, IL, USA).

**Results**

In our study, total 675 neonates were admitted in out born NICU over 3 month’s duration, of these 17.5% preterm and 82.5% were term neonates. Prevalence of respiratory distress in admitted neonates was 29.6%. Most of them respiratory distress neonates affected in the birth weight between 1000 grams to 1499 grams. Most common cause for respiratory distress was sepsis (pneumonia) 38.9% followed by respiratory distress syndrome (23%), meconium aspiration syndrome (20.5%), transient tachypnea of newborn (10%), congenital heart disease (6%), congenital diaphragmatic hernia (1%) and pulmonary hemorrhage (1%). In our study prevalence of death in respiratory distress neonate was 41% (82), of these most common cause of mortality was sepsis followed by respiratory distress syndrome. In this study 82 respiratory distress neonates had respiratory failure, needed mechanical ventilation therapy.

**Discussion**

In our study, total 675 neonates were admitted in out born NICU over 3 month’s duration, of these 17.5% preterm and 82.5% were term neonates. In Khatua SP et al., study among 182 babies with RD 133 (73%) babies were term infants and 49 (29%) were preterm [3]. In this study prevalence of respiratory distress was 29.6%. The study done by Mathur et al., shows similar finding, prevalence was 29% [2]. In our study high rate of respiratory distress was noticed in neonates. This is because our hospital is the main referral Centre in north western part of Rajasthan and we received most of babies the in terminal stage. Term (50%) and preterm (50%) babies were equally affected [Table 1]. 15% of term and 29% of late preterm infants admitted to the neonatal intensive care unit develop significant morbidity [5]. Certain risk factors like prematurity, meconium stained liquor, congenital heart disease and maternal fever. To benefit those infants who will deliver prematurely, multiple randomized clinical trials strongly support the use of maternal antenatal corticosteroids. Two doses of betamethasone significantly reduce the incidence of RDS, intra-ventricular haemorrhage, and mortality in infants age 23 to 29 weeks’ gestation [6,7].

In our study it was observe that, most common cause for respiratory distress was sepsis (pneumonia) 38.9% followed by respiratory distress syndrome (23%), meconium aspiration syndrome (20.5%), and transient tachypnea of newborn (10%), congenital heart disease (6%), congenital diaphragmatic hernia (1%) and

pulmonary hemorrhage (1%) [Table 2]. Mathur et al., shows neonatal pneumonia was the most common cause of respiratory distress in the referred neonates (68.7%) [2]. On the basis of strong evidence, including randomized control trials and Cochrane Reviews, administration of antenatal corticosteroids and postnatal surfactant decrease respiratory morbidity associated with RDS [6,7].

In our study Sepsis/pneumonia is the most common cause of respiratory distress, the exact cause is unknown. This may be due to most of referred babies were delivered at home by untrained dais in unhygienic conditions and referred by peripheral health centres. Extensive evidence, including randomized control trials, cohort studies, and expert opinion, supports maternal group B streptococcus screening, intra-partum antibiotic prophylaxis, and appropriate follow-up of high-risk newborns according to guidelines established by the Centres for Disease Control and Prevention [8-10]. In our study sepsis/pneumonia is the most common cause because inborn neonates were not included.

Most of the previous studies shows transient tachypnoea of new-born was the most common cause; preventive measures may include avoiding elective caesarean section before the onset of labor in infants younger than 39 weeks’ gestation [11,12].

In our study, ventilator support was needed in 31% of cases 23.5% of cases needed nasal CPAP, while 9% of cases needed surfactant therapy. In the overall study 118 (59%) respiratory distress neonates were survived and with 82 (31%) deaths [Figure 1]. Sepsis was the main cause for ventilation. In this study 82 respiratory distress neonates had respiratory failure, needed mechanical ventilation therapy. The survival rate was 59% among RD cases admitted to NICU. The common cause of death was sepsis followed by respiratory distress syndrome.

**Table 1: Distribution of Respiratory Distress neonates based on Gestational age**

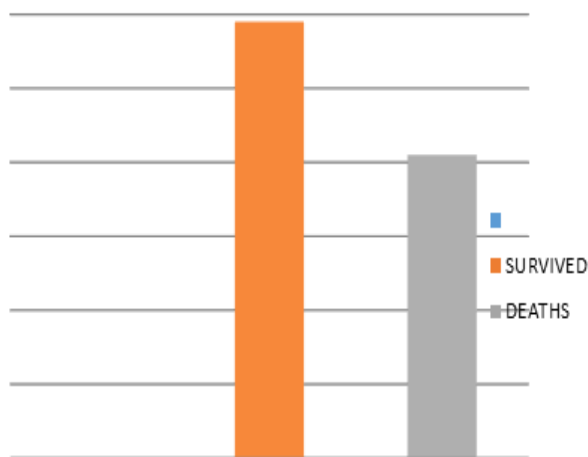
Gestational age	No. of admitted Neonates	No. of Respiratory Distress Neonates
<37 weeks	118(17.5%)	100(50%)
>37 week	557(82.5%)	100(50%)
Total	675(100%)	200(100%)

**Table 2: Distribution of causes of Respiratory distress Neonates**

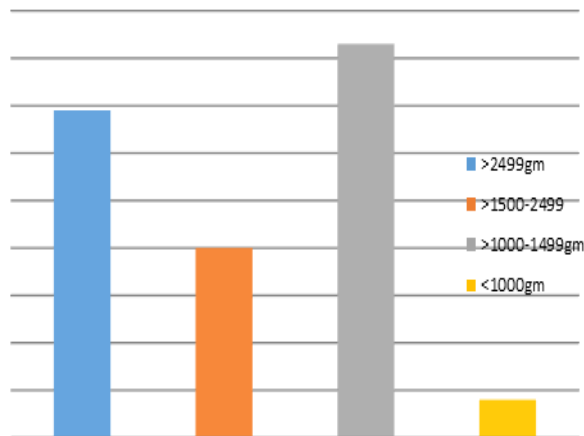
Etiology	No. of cases (N=200)	Percentage (%)
Pneumonia(sepsis)	77	38.5
Respiratory Distress syndrome (RDS)	46	23
Meconium aspiration syndrome (MAS)	41	20.5
Transient tachypnea of newborn (TTN)	20	10
Congenital heart disease (CHD)	12	6
Congenital Diaphragmatic Hernia (CDH)	2	1
Pulmonary hemorrhage	2	1

**Table 3: Number and percentage of variety of treatment given to neonates**

Treatment used	No. of cases (N=200)	Percentage (%)
Antibiotics parenteral	200	100
Oxygen	153	76.5
Continuous positive airway pressure	47	23.5
Surfactant	18	9
Mechanical ventilation	82	41
Surgery for CDH	1	0.5



**Fig. 1: Graph showing distribution of outcome of respiratory distress neonates**



**Fig. 2: Graph showing distribution of respiratory distress neonates based on birth weight**

**Conclusions**

Respiratory distress in neonates is the most commonly encountered problem in NICU. Early diagnosis and treatment will prevent the mortality. The knowledge of the causes of respiratory distress is important to plan facilities. Our study strongly recommends following simple steps like hand washing, breastfeeding and antenatal steroid therapy which will prevent respiratory distress in neonates. Early recognition and treatment of the common neonatal respiratory diseases will decrease both short- and long-term complications and related mortality of at-risk infants.

**Limitations**

Sample size of our study is small compared to other study and long term follow-up study was not done in our study. It is necessary to follow-up the respiratory distress neonates to know the morbidities like broncho-pulmonary dysplasia. In our study blood culture investigations was not done in sepsis screened positive patients and blood culture is mandatory to know the exact aetiology of sepsis in neonates.

**Conflicts of interest:** None declared

**Acknowledgements:** None

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